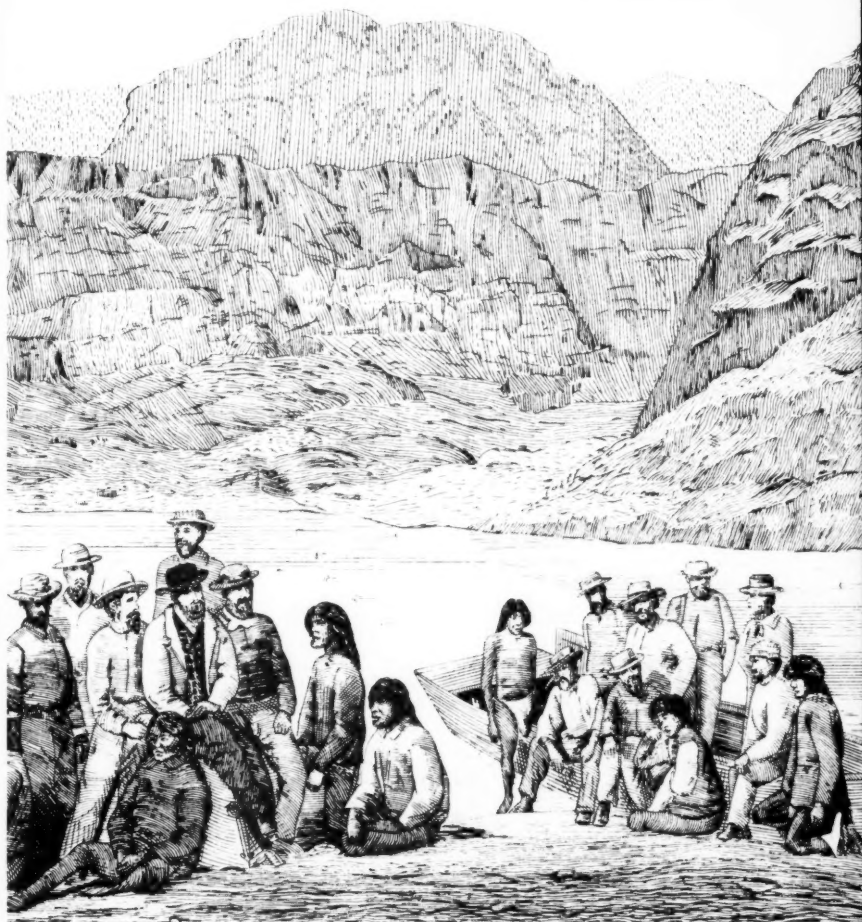


GEO TIMES

Successor to the Geological Newsletter



April 1957

Volume 1, No. 10

Published Monthly by the
American Geological Institute

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Calendar

Cooperation of Society Secretaries in supplying meeting notices for GEOTIMES calendar is requested.

- April 1, 1957—AGT. Cent. Sec., 9:00 AM, Kiel Audit. Conv. Hall. Comm. room C, St. Louis, Mo.
- April 1-4, 1957—A.A.P.G., National Convention, Kiel Auditorium, St. Louis, Mo.
- April 5, 6, 1957—PACIFIC SOUTHWEST MINERAL INDUSTRY CONF., sponsored by Nevada, San Francisco & So. Calif. Secs. of A.I.M.E., Reno, Nev.
- April 19-20, 1957—G.S.A., Cordilleran Sec., ann. mtg.; P.C. Br. of P.S. & the S.S.A. also meet at UCLA, Los Angeles, Calif.
- April 21-24, 1957—SYMPOSIUM ON ROCK MECHANICS, 2nd Annual, Colo. School of Mines, Golden, Colo. Theme: Behavior of Material in Earth's Crust.
- April 22-25, 1957—CANADIAN INST. OF MINING & METALLURGY, Ann. Gen. Mtg., Chateau Laurier, Ottawa, Ont.
- April 25-27, 1957—SPRING FIELD CONF., Ky. Geol. Soc. & Appalachian Geol. Soc., Cumberland Hotel, Middlesboro, Ky.
- April 29-May 1, 1957—AMERICAN GEOPHYSICAL UNION, 38th Annual Meetings, Washington, D. C.
- May 2-4, 1957—PANHANDLE GEOL. SOC. Field Trip of S. W. Oklahoma. Write: P. O. Box 2473, Amarillo, Texas.
- May 5-9, 1957—AMERICAN CERAMIC SOCIETY, 59th Ann. Mtg., Statler Hilton Hotel, Dallas, Texas.
- May 5-11, 1957—SECOND CUBAN PETROLEUM CONGRESS, Havana, Cuba.
- May 6-8, 1957—INSTITUTE ON LAKE SUPERIOR GEOLOGY, 3rd Annual Meeting, Kellogg Center, Michigan State Univ., East Lansing, Mich.
- May 7, 1957 — INTERNATIONAL HYDROGRAPHIC CONF., Seventh Congress, Monte Carlo, Monaco.
- May 10-11, 1957—G.S.A., ROCKY MTN. SECT., 10th Annual Meeting, Logan, Utah. For information write to Sec'y. of the Sect., Gordon S. Wise, P.O. Box 58, Salt Lake City.
- May 16-18, 1957 — G.S.A., SOUTHEASTERN SECTION, Morgantown, W. Va.
- 1957-58 — INTERNATIONAL GEOPHYSICAL YEAR.
- July 10-19, 1957—INTERNATIONAL UNION OF CRYSTALLOGRAPHY, 4th General Assembly & International Congress. McGill Univ., Montreal, Quebec.
- July 16-22, 1957—SYMPOSIUM ON GEOCHEMISTRY, IUPAC Comm. of Geochem. & Sect. of Inorg. Chem. Paris, France.
- August, 1957—INTERNAT. ASSOC. OF SEISMOLOGY & Physics of the Earth's Interior, Toronto, Ont.
- August, 1957—INTERNATIONAL ASSOC. OF PHYSICAL OCEANOGRAPHY, General Assembly, Canada.
- Aug. 19-23, 1957—SIXTH NATIONAL CLAY CONFERENCE, Univ. of Calif., Berkeley. Reg. fee \$6.00: Univ. Extension, Univ. of Calif., Berkeley 4, Calif.
- Sept. 3-14, 1957 —INTERNAT. UNION OF GEODESY & GEOPHYSICS, 11th Gen. Assembly, Toronto, Canada. Add.: Dr. J. A. Jacobs, 49 St. George St., Toronto, Ont., Canada.
- Sept. 5-7, 1957—NEW MEXICO GEOL. SOC., Eighth Ann. Field Conf. in the Durango-Silverton-Ouray area of S. W. Colo.
- Sept. 9-10, 1957—AMER. CERAMIC SOC., Basic Science Div., State U. of N.Y. Coll. of Ceramics, Alfred Univ., Alfred, N. Y.
- Oct. 15-18, 1957—SOUTHEASTERN STATES MINING CONF., sponsored by Fla. Sect. AIME & the Soc. of Min. Engrs. of AIME, Hillsboro Hotel, Tampa, Fla.
- Sept. 20-27, 1957 — FIFTH CONGRESS OF INQUA, Madrid, Spain. For information write: L. Sole Sabaris, Instituto Geologico, Universidad Barcelona, Spain.
- Oct. 17-19, 1957—FOUR CORNERS GEOLOGICAL SOC. FIELD CONFERENCE, 2nd Gallup New Mex. For information write P. O. Box 615, Albuquerque, N. M.
- Nov. 3, 1957—SVP ANN. MTG., Acad. Nat. Sci., Philadelphia, Pa.
- Nov. 4-5, 1957—SVP Technical Sessions, with GSA, etc., Atlantic City, N. J.
- Nov. 4-6, 1957—GSA, ANN. MTG., Atlantic City, N. J.
- Nov. 18-Dec. 9, 1957—9TH PACIFIC SCIENCE CONGRESS, Pacif. Sci. Assoc., Chulalongkorn University, Bangkok, Thailand.
- Dec. 26-31, 1957—AAAS, Nat. Mtg., Indianapolis, Ind.
- 1960—XXIst INTERNATIONAL GEOLOGICAL CONGRESS, Copenhagen, Denmark. Field excursions to Scandinavian countries.

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Successor to the Geological Newsletter

Published by **THE AMERICAN GEOLOGICAL INSTITUTE**

Robert C. Stephenson,
EDITOR

Kathryn Lohman
CIRCULATION MANAGER

VOL. 1, No. 10

APRIL 1957

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GeoTimes is published monthly by the American Geological Institute at Williams & Heintz Lithograph Corporation, Washington, D. C. Editorial, Circulation and Advertising Offices are at 1515 Massachusetts Ave., N.W. Address all correspondence to 2101 Constitution Ave., N.W., Washington 25, D. C.

Subscriptions: Distributed to members of member societies as a part of their societies' membership. Non-member, U.S.A. and Possessions, Canada and Mexico, \$2.00 per year; elsewhere, \$2.50 per year. The American Geological Institute and its member societies assume no responsibility for the statements and opinions advanced by contributors to GeoTimes.



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The Mineral Future

Rear Admiral H. G. Rickover, USN, Chief, Naval Reactors Branch, U. S. Atomic Energy Commission, gave the principal address at the Awards Banquet of the 16th Annual Science Talent Search recently in Washington. His talk could well have been delivered before a convocation of the A.I.M.E. or the A.A.P.G., for it stressed the urgency of meeting our ever-increasing needs for dwindling raw materials by improved quality and application of scientific and technical manpower. To use the Admiral's words, "We must substitute intellectual resources for diminishing materials resources." He also commented that, "from a scarcely populated, fabulously resources-rich country 180 years ago, we have changed to a densely populated, resources-poor country today . . . When measured with our wealth of but a few short years ago, we are therefor poor, and we are poorer still when measured against our future needs."

We in geology can applaud Admiral Rickover's concern over our non-renewable resources, but we cannot and should not share his gloom over our future mineral economy. Time and time again it has been shown that, given the proper stimulus and incentive, the scientists and technologists have met the challenge of finding and developing new resources.

Raw materials—both metallic and non-metallic—are of basic importance to our great industrial machine which today is geared to an unprecedented development and production of consumer goods and vital defense needs. Vast sums are poured into research for more and better products of industry, but, by comparison, only a trickle of funds is probing the basic research frontiers of new ways to find more mineral resources.

Genuine enthusiasm for a strong national mineral resource policy is lacking: The reception of the recently proposed Mineral Research Institute has been lukewarm; the support of the A.A.P.G. Research Fund has not been spontaneous. These instances, to cite only a few, depict our national lethargy with regard to the problems of our mineral future.



OUR COVER

Colorado River Party at mouth of Diamond Creek, 1871. Reproduced from U.S. Geographical Surveys West of the 100th Meridian, courtesy of the U.S. Geological Survey.

The AMERICAN GEOLOGICAL INSTITUTE is a non-profit professional service organization established and managed by the scientific societies in the fields of geology and geophysics in cooperation with the National Academy of Sciences-National Research Council. It is the instrument of the profession serving and advancing the welfare of the geoscientist in matters relating to education, professional responsibilities and government relations. It is an active member of the Scientific Manpower Commission. It also functions in the stimulation of public education and awareness of the earth sciences, through career literature, the scouting program and other channels of communication.

GEOTIMES is the news magazine of the geological sciences. It reports on current events in the earth sciences, public education and public relations efforts throughout the profession, as well as appropriate legislative and governmental issues. It announces scholarships, fellowships, publications and new developments. It provides a forum for discussion of timely professional problems, and affords a common bond between the many specialized groups within the earth sciences.

The Geologists' Association in Jamaica, B. W. I.

By L. J. CHUBB¹

Before the new Geological Survey of Jamaica was established in 1949, the average educated Jamaican had little understanding of geology. A survey by C. A. Matley and G. M. Stockley after World War I was abruptly terminated in 1925 by the unappreciative authorities of those days, and for 24 years there was no official Geological Survey in the island. It was during this period that the vast Mona Reservoir was constructed, at a cost of £250,000, on a thick formation of Pleistocene sands and gravels so pervious that the water seeped away as fast as it flowed in. The discovery that the arid Clarendon Plains could be irrigated by borehole wells was long delayed owing to the interruption, and it was left to the soil-chemists to discover that the abundant red earth resting on Tertiary limestone was often so highly aluminous that it ranked as a low grade bauxite.

In 1949 the Jamaica Government was willing to approve the formation of a new Geological Survey, financed by a grant from the Colonial Development and Welfare Fund of the British Colonial Office, but even then few of the people of Jamaica had much understanding of the functions of their new department. When our geologists stopped at a road cut, passers-by would ask such questions as, "Why do you come here? There is no gold here." A member of the House of Representatives questioned the Government as to why they did not set their geologists to finding oil. Articles appeared in the local press; some showing a lack of understanding of our objects, and some actually derogatory. For example, it was urged that what Jamaica needed was a geophysical, not a geological survey. It became obvious that an educational campaign was necessary, and this we attempted to carry out by means of articles in the papers and in the Farmer's Handbook, lectures to local societies, broadcasts on Radio Jamaica, and exhibits at agricultural and industrial fairs.

¹ Dr. L. J. Chubb, Director of the Geological Survey of Jamaica, has done an outstanding job of creating public awareness of geology in Jamaica. He has been instrumental in the organization of a branch of the Geologists Association (a British amateur society) and in stimulating favorable press and radio coverage of geology. Bauxite is, of course, the most important mineral commodity of the island and petroleum exploration is in progress.

Gradually prejudices were broken down, and a better understanding of the functions of geology came into being.

In May, 1955, the writer, at the request of the Association of Assistant Masters and Mistresses (the organization of the high school teachers) gave a lecture on the Teaching of Geology in Schools. The talk was largely based on a discussion of the same subject held by the Geologists' Association in London in 1946, and some account of the latter association was given. The audience showed great interest, and as several asked if it would be possible for them to join, a recruiting campaign was started.

The Geologists' Association is mainly an amateur body, though it has some professionals. It was founded in London in 1858 and today numbers about 2,000 members. It is very active, running many field-trips, holding monthly meetings for the reading of papers or lectures, and issuing quarterly "Proceedings" which can bear comparison with the publications of many more pretentious societies.

Probably about 50 per cent of the members live in the Greater London area, another 40 per cent in other parts of Britain, and perhaps 10 per cent are scattered throughout almost every other country in the world. Only the Londoners can normally take part in the Association's activi-

ties, and for the benefit of the others, one of the rules states that, "at the request of members residing at a distance from London, the Council may, at its discretion, recognize Local Groups of at least twelve members of the Association who organize their own Meetings." Several such groups exist in Britain, but no overseas group had previously been formed.

JAMAICAN ASSOCIATION

Every candidate must have two sponsors. There were only two active members in Jamaica at the time, and they sponsored all the earlier candidates. Recruiting was started among the officers of the Geological Survey. The two geologists who were not already members joined, as did nearly all the technical, surveying, drafting and administrative staff of the Department; the three scientific members of the Institute of Jamaica also joined. A number of civil servants and industrialists, whose work had some contact with geology, were invited to join and nearly all did so. The Chief Minister, the Hon. N. W. Manley, whose portfolio included the Geological Survey, also joined. Thus no fewer than eighteen proposal forms were forwarded to England in time to have their first reading at the meeting of the Geologists' Association held in London on June 10, 1955, and these were all duly elected at the July meeting.

Thereafter recruiting continued actively, especially among school teachers, and on October 7 the Inaugural Meeting of the Jamaica Group was held. It was attended by 37 members, a very satisfactory figure considering that the total membership was then 61, of whom 14 were country members and 8 were known to be abroad. The meeting elected a committee, discussed future activities, and was followed by a dinner.

FIELD TRIPS POPULAR

A program was drawn up, which has since been carried out. There have been seven field trips and three lectures. Attendance on the excursions has varied from 25 to 42, and at the lectures, which were thrown open to the public, from 60 to 200. The first field trip was a traverse through the Port Royal Mountains, a folded and overthrust belt, with diapirs of gypsum and lodes of magnetite and hematite. A boat trip to certain coral cays was so popular that it had to be repeated. A lecture on the development of the underground water resources of the Clarendon

continued on page 12

CANADA HOST TO I.U.G.G.

International Meeting of Geophysicists in Toronto, Sept. 3-14

The XIth General Assembly of the International Union of Geodesy and Geophysics is to meet on the campus of the University of Toronto, September 3-14. Inasmuch as this meeting begins shortly after the July 1 launching of the International Geophysical Year, the meeting will be especially significant.

An estimated 1500 scientists will attend the convocation of I.U.G.G., representing the participating scientific organizations of the more than 50 nations participating in the IGY. Large delegations are expected from India, Russia, Britain, and the United States.

There will be appropriate coverage of the more spectacular, headline making aspects of the IGY such as the earth satellite program, oceanographic studies and the Antarctic expeditions. However, during the two-week meeting there will be technical sessions of the seven international associations which are brought together under the I.U.G.G. These are:

*International Association of Geodesy
International Association of Seismology
and Physics of the Earth's Interior
International Association of Meteorology
International Association of Geomagnetism
and Aeronomy
International Association of Physical
Oceanography
International Association of Hydrology
International Association of Volcanology*

The technical sessions will be largely centered around the 18-month program of the IGY.

EXPLORATION GEOPHYSICS

Canadian geophysicists, who have pioneered exploration geophysics in the search for mineral deposits and led the way in many technologic advances, contribute significantly to the program on Exploration Geophysics.

The Committee for Arrangements at the Toronto meeting of the I.U.G.G. in Toronto is Dr. J. T. Wilson, Professor and Head, Geophysics Laboratory, University of Toronto, *Chairman*; Mr. A. Thomson, *Vice-Chairman*; and Dr. J. A. Jacobs, Professor, Geophysics Laboratory, University of Toronto, *Secretary*. Professor K. R. Ramanaathan of India is President of the International Union of Geodesy and Geophysics.

To Teachers of Geology

By C. F. PARK, JR.¹

Our colleges and universities are training future leaders—supposedly well educated young men and women of unimpeachable moral integrity, and with broad vision and imagination. In no field of endeavor are such leaders needed more than in the Earth Sciences. How well are we who teach geology doing our part? Are we training the leaders who are so badly needed? Do we ever emphasize, or even mention, the ideal human character, or the ideal ends of human action? In a much more prosaic manner, do we even emphasize the fact that full services must be delivered for obligations incurred? The incurred obligations may be financial or otherwise, but it is in the field of financial obligations that the temptations to deviate from desirable standards are greatest.

College instructors have a unique opportunity and responsibility to guide young people during their early professional years. The moral habits and character of an individual are largely crystallized during early formative years—those years in college and before. Thus a college teacher probably exerts greater influence on development of the moral integrity and character of young people than does any other person outside of the home. Young people tend to learn by example. They commonly have confidence in and emulate their instructors. All of us remember one or more of our teachers or associates from whom we have obtained inspiration and courage. We respect these teachers and associates, not only for their professional ability, but also for their undeviating incorruptibility—they were “square shooters.” The first responsibility of a teacher is to set his own standards at a higher than acceptable level, and to lean over backwards to maintain these standards. An instructor with questionable ethics has no business teaching.

An instructor should also point out some of the more common pitfalls to his students. What are these pitfalls, and how may they be avoided? To define a successful man is not easy, and all too often people consider that money and success are synonyms. Certainly a successful geologist has a degree of financial independence, but he also has a carefully nurtured self-respect and the respect of others who know him. Young people naturally want to get ahead, and to win professional rec-

ognition quickly—they want to be successful. They are tempted by offers of higher salaries, and they may thoughtlessly push aside obligations to employers. A person must, of course, be free to change positions and thus to better his working and living conditions. Nevertheless, where a company has invested time and money in the training of a young person, that person has a definite obligation to stay with the employer at least long enough to return the investment. Under no circumstances should a geologist leave one company and enter the employ of a competitor in the same district, without the lapse of an adequate period of time—say two years. To do otherwise is to capitalize for personal benefit by selling to a competitor information that rightly belongs to an employer.

A young geologist who undertakes consulting or examination jobs should first clarify his field of competency. How much does the average petroleum geologist know about the localization of tungsten ores? The instructor should point out to students that they are held morally, and at times legally, responsible for publication of promotional materials over their names, whether or not they are aware of the specific publication. They must be cautioned to retain the right to edit excerpts removed from context and published for promotional purposes. Examples where parts of reports were used in prospecti have been recognized repeatedly during the recent uranium boom, and one might add that, while individual geologists may have added temporarily to their exchequers, the end results have been unfortunate for them professionally.

Plagiarism ordinarily does not involve money. It is a form of self-glorification combined with mental laziness that may

¹ Dr. Charles F. Park, Jr., is Dean of the School of Mineral Science, Stanford University. An economic geologist, he was for a number of years associated with the U. S. Geological Survey. His article is a condensation of one appearing in *Economic Geology*, Vol. 51, pp. 596-598, 1956.

Exploration Geophysicists Scholarship Program

An outstanding example of an aggressive professional approach to the problem stimulating careers in science is the recently announced scholarship program of the Society of Exploration Geophysicists. At present SEGp has a college scholarship fund of \$8,000 from seven companies engaged in exploration geophysics or in supplying the industry. Each scholarship is identified with the contributing company and is awarded by the Student Membership Committee of the SEGp. Those companies who have provided scholarships are:

*Geophysical Service, Inc.
Grant Body and Equipment Co.
Griffin Tank and Welding Service
Herb J. Hawthorne, Inc.
Mayhew Supply Co.
Southwestern Industrial Electronics Co.
Vector Manufacturing Co.*

A general fund has been started with an initial contribution from Exploration Consultants, Inc. Companies interested in participating in the SEGp program may write to Mr. Bart W. Sorge, *Chairman of SEGp Public Relations Committee, c/o United Geophysical Corp., Pasadena, California.*

Students who wish to apply for the geophysical scholarships may obtain forms by writing Society of Exploration Geophysicists, Box 1536, Tulsa 1, Okla.

lead to practiced intellectual dishonesty. Students should be encouraged to give credit wherever due.

Finally claim jumping and other types of "land grabs", by whatever name, should be mentioned. While conceivably unintentional, most "deals" of this type must be relegated to the realm of intentional dishonesty. This is the quickest way possible to end a career in geology.

Geology is small as professional fields go, and much business is conducted on a person to person basis. A questionable reputation is quickly recognized and is a serious handicap to a young geologist. The greatest responsibility of geology teachers is to start young people in their work with a maximum of knowledge and a minimum of handicaps. In striving to improve instruction, let us remember to emphasize ethics.

FOUR WESTINGHOUSE AWARD WINNERS HAVE GEOLOGIC INTERESTS

The forty high school student winners of the recent 16th annual Science Talent Search include four with geologic interests. Ten per cent is a record high, and we hope it is part of a trend of increasing interest among teenagers.

This group of forty is the cream of more than 20,000 contestants competing for \$11,000 in scholarships supplied by the Westinghouse Educational Foundation. The young scientists visited Washington March 7-11 for lectures, sight-seeing, and evaluation by judges. An important factor in each student's showing is an essay describing the scientific project he or she has done.

The four young scientists visited the U.S. National Museum on March 8, both to see the exhibits and to talk to people with similar interests. G. Arthur Cooper, Head Curator of Geology, showed the group displays including two new dioramas. The four students also visited other staff members of the Museum and U. S. Geological Survey.

David Adams, Neosho, Missouri, hopes to become a paleontologist. His project was the identification of fossils from the Mississippian Keokuk limestone, and reconstruction of their habitat. David was named an alternate to one of the eight \$400 scholarships. (Pictured above)

Sonia R. Anderson, from Omaha, Nebr., had for project and display "Eastern Nebraska Fossils." Sonia was awarded one of the eight \$400 scholarships. She hopes to major in petroleum chemistry at the University of Nebraska. (Pictured above)

Roger J. Cuffey, Bloomington, Indiana, is interested in both astronomy and geology. "Observations of Mars in 1954 and 1956" was Roger's project. He plans to go to a school with strong departments in both geology and astronomy, before deciding which will be his career.

Jeffrey S. Hanor, Arlington Heights, Illinois, has several interests, including chemistry and geology. Jeffrey studied the "Deterioration of Natural Rubber by Metallic Catalysts." His geological interests are mineralogy, as well as general geology and paleontology.



BSA GEOLOGY MONTH OCTOBER 1957



**This is a
Bandwagon
We Should All
Climb On**

From the AAPG headquarters comes the enthusiastic suggestion that Geology Month in Scouting, October, 1957, is "about the biggest public relations project ever undertaken in the name of our science." It is imperative that the project receive the strongest possible support from geologists everywhere, working at the local level.

A letter went out recently from the National Council of the Boy Scouts of America to the scout executives of the 538 Regional Councils describing the Geology Month program and enclosing a reprint of the article from the January GeoTimes. These men direct the activities of the 68,000 scout troops and explorer units that will follow the Geology program next October.

A few direct quotations will express the opinions of the scout leaders, "... this can be one of the most interesting themes for scouts in many years. Rarely have we had a more important program area for scouts to explore." With the kit, which "has been prepared by an active group of Scouters who are also professional geologists... any unit anywhere, can develop a meaningful month's program (on geology), high in boy-interest and high in citizenship-training value that means so much in our total program."

The Geology program kit was compiled through the efforts of the AAPG-AGI Boy Scout Committees and is now being published by the American Petroleum Institute.

The ground work has been carefully laid, but the real success depends upon geologists-geophysicists in all parts of the country volunteering to work collectively or individually with the nearest of the 538 Scout Councils in planning for a successful Geology Month. Now is the time to make the contact. Upon establishing contact with the local Council, advise Chalmers Cooper c/o of the AGI, so the area can be checked off and you can receive pertinent data.

Help make October, 1957, the "GREATEST SHOW ON EARTH" for scouts everywhere.



by
Bob
Bates

Two projects designed to interest high school teachers and students in geology are the annual Earth Science Conference at Bowling Green State University, northwestern Ohio, and a field trip sponsored by the Rocky Mountain Association of Geologists. The former, set up in 1953, is a one-day session held in the fall. For its first three years the conference featured talks and exhibits on geology, geography, meteorology, and astronomy, organized for, and in part by, high school teachers. Last fall Director John Coash decided on a different approach, namely to focus attention on an individual county. Through co-operation of the Seneca County school superintendent, the meeting was held at a county school and invitations were sent to 14 high schools in Seneca County. Twenty-two teachers and students attended a morning session on general geology and an afternoon field trip. The response was encouraging and future conferences in other counties are planned.

The half-day field trip of the R.M.A.G. was designed to acquaint teachers with the geology of the Denver area in the hope that they will guide some of their students toward geology. Led by Bruce Curtis, the Association's president, and by several other geologists, the group assembled at Red Rocks Amphitheater and then examined nearby formations, structures, and oil, water, and uranium occurrences. The turnout was small but enthusiastic. One result may be the establishment of a special short course in geology at the University of Colorado; a potential enrollment of 50 was indicated.

It is a pleasure to call attention to "An Introduction to Geology," the film strip and recorded talk prepared by a committee of the Kansas Geological Society. Thirty minutes in length, the talk is beamed at high school students and their parents, utilizing travel as the common ground between audience and subject. Those of us who saw the preview at the 1956 A.A.P.G. meeting can well believe that the film strip and talk will hold the undivided attention of students and parents alike. The unit may be bought or rented; address inquiries to Kenneth Redman, 508 East Murdock, Wichita, Kansas.

Geology Enrollment

Observations on the Teaching of Geology to Meet Science Requirements

By LeROY T. PATTON¹

From time to time comments appear in geological publications concerning the disproportionately small enrollment of students in beginning geology courses as compared with the enrollment in corresponding courses in other sciences. This is particularly true in liberal arts colleges and in schools of arts and sciences in the universities. This situation is no doubt the result of a number of causes, but the object of this article is to call attention to only one which, it is believed, has not been given much consideration.

At least some, and perhaps a large proportion of liberal arts students registering for science courses, do so because of degree requirements. Degree requirements differ from institution to institution, but a very common one is the requirement of certain number of hours of a "laboratory science." This requirement is obviously the result of the influence of departments such as physics and chemistry which are naturally laboratory sciences.

Instead of endeavoring to have the laboratory requirement removed, geology departments in general have attempted to make the beginning courses laboratory courses. This the writer believes is a mistake from two standpoints. General geology is not naturally a laboratory subject and an attempt to make it so results in an artificial rather than a natural course. Instead of a laboratory science it is naturally a field science, but students cannot be taken into the field in most localities to an extent commensurable with the laboratory work required in those subjects which are naturally laboratory sciences. Furthermore, the attempt to make general geology a laboratory science results in a distinct loss of interest on the part of students who would find a lecture demonstration course with a reasonable number

¹ Dr. LeRoy Patton, Professor Emeritus and former Head of the Geology Department at Texas Tech. has been identified with research on west Texas geology for many years. For 26 years he was head of the Geology Department and his entire professional career was devoted to teaching.

Canadian Science Education

The Canadian Society of Exploration Geophysicists has recently announced a Scholarship Program in Education aimed at improving the teaching of science and mathematics in Canadian high schools. Scholarships of \$350 are available at the Universities of British Columbia, Alberta, Saskatchewan open to high school graduates who are outstanding in mathematics and the sciences and who intend to pursue a science teaching career. The scholarships are supported through company contributions.

St. Louis University Offers Geophysics Fellowships

The Department of Geophysics and Geophysical Engineering of St. Louis University is receiving applications for two fellowships supporting graduate study in geophysics.

Under a research grant from the Shell Oil Company on the fundamental nature and behavior of explosion-generated elastic waves, an \$1,800, 12-month fellowship is open to students with at least one year of training completed.

A Gulf Research and Development Co. sponsored fellowship is open to a graduate student of one year who is working toward the doctorate. This carries a stipend of \$2,000, in nine monthly installments and also provides for payment of tuition and fees.

The closing date is May 15, 1957, and applicants should write: Dean of the Graduate School, St. Louis University, 221 North Grand Blvd., St. Louis 3, Mo.

of field trips most interesting and inspiring.

Many different attempts have been made to devise a suitable laboratory course in general geology and many different manuals have been published. All of them, including those of the writer, have resulted in "dry as dust" laboratory work which students have a decided tendency to avoid.

This handicap ought to be removed, and this could easily be done by having the laboratory requirement dropped. This would call for some diplomacy in dealing with the departments which would like to retain this requirement since it channels students into their courses, but with the right approach they could be induced to abandon this illogical requirement.

West Virginia Host To GSA Southeastern Section

Morgantown
May 16-18

Exploration and production geologists and engineers will find much of interest in the program of the Morgantown, West Virginia meeting of the Southeastern Section, Geological Society of America on May 16-18, which will feature exploration trends. Hosts for the sessions are the West Virginia Geological Survey and the Department of Geology of West Virginia University. Four half-day sessions for technical papers have been arranged for Thursday and Friday.

In recognition of the great influence which world political, economic, and technologic developments will have on exploration and production schedules of the next few years, the program committee under the chairmanship of Dr. Wallace W. Hagan, Consulting Geologist of Owensboro, Kentucky, has designated "*Economic Geology of the Southeastern United States in Relation to Recent World Events*" as the central theme of the meeting. Review papers covering each of the mineral resource fields: metals, industrial minerals, coal, petroleum, radioactive minerals, and water supply will be scheduled.

Another unique feature of the meeting will be a symposium on Friday afternoon concerned with interpreting recent gravity and magnetic surveys by the United States Geological Survey in northwestern Virginia and eastern West Virginia. Five geologists will interpret the geophysical findings in terms of the structure, stratigraphy, and resources of the areas covered.

A Saturday field trip is being arranged to the new Humphrey Mine and Beneficiation Plant of the Pittsburgh Consolidation Coal Company at Morgantown. A concurrent trip will include stops at local sandstone quarries and limestone mines, representative sections illustrating Mississippian and Pennsylvanian stratigraphy, and gas well locations. Opportunity will also be provided to visit the Appalachian Experiment Station of the United States Bureau of Mines.

A smoker on Thursday evening, the annual banquet on Friday evening, and a full social and sightseeing program for the



Planning for the SE Section GSA meeting are, left to right, Dr. M. T. Heald, Department of Geology, West Va. University, PUBLICITY CHAIRMAN; Dr. Paul H. Price, State Geologist, CHAIRMAN SE Section GSA; Dr. John C. Ludlum, GENERAL CHAIRMAN; and Dr. H. M. Fridley, Head Dept. of Geology.

visiting ladies will complement the technical meetings.

It is hoped that the location of Morgantown near the northern limit of the section will encourage geologists and engineers from Ohio, Pennsylvania, Maryland, and the District of Columbia to attend the meetings. Information on hotels and mailings of the final program may be obtained from the WEST VIRGINIA GEOLOGICAL SURVEY, P.O. Box 879, Morgantown, West Virginia.

JAMAICA *continued from page 7*

Plains was followed by a tour of the area with its borehole wells and distributing canals. An excursion to a series of limestone caves proved to be so strenuous that of the 40 members who started, only twelve emerged from the last cave.

The best attended lecture held to date was given by the Works Manager of Alumina Jamaica Limited who introduced two films on the operations of his company. On the following Sunday 42 members and friends visited its quarries, bauxite mines and plant, and afterwards were the guests of the company at lunch in a leading hotel. The last field trip of the season was to the Benbow Inlier, where fossiliferous Cretaceous limestones are interbedded in a thick series of tuffs so rich in magnetite as to produce a marked anomaly, first detected during an airborne magnetometer survey.

When Dr. H. C. Versey, Professor of Geology at Leeds University, visited Jamaica on his way to the International Geological Congress in Mexico, he gave a lantern lecture on, "*A Comparison between British and Jamaican Limestone Scenery.*"

TWO THOUSAND VISITORS ATTEND STANFORD MINERAL SCIENCES OPEN HOUSE



Stanford University's School of Mineral Sciences opened its doors to an estimated 2000 enthusiastic visitors including adults, grade school, high school, and college students on November 30, 1956.

The Open House featured special lectures, colorful and eye-appealing exhibits, demonstrations, and movies—explaining in layman's terms the theory and application of geology, geochemistry, geophysics; petroleum, mineral, and metallurgical engineering. The School wishes to extend special thanks to the numerous companies and individuals that assisted in this endeavor.

The Stanford Mineral Sciences biennial Open House is part of a program designed to publicize the earth sciences. In addition to extensive newspaper publicity, special invitations to the event were sent to 80



high schools and twelve colleges in the Stanford area. School groups attending were given special guided tours. Career opportunities in the earth sciences were emphasized, and more than 500 booklets describing such careers were distributed.

The meeting was well attended, and it is planned to invite other visiting geologists to address the Jamaica Group.

DE LA BECHE

At the first Annual General Meeting held in December, 1956, it was announced that the Group had recruited its hundredth member. It now constitutes a larger percentage of the population of Jamaica than the parent body does of the population of Britain. A provisional program for 1957 has been drawn up, including several field trips and lectures. One of our plans is to erect a commemorative tablet at Halse Hall, the family home of Sir Henry Thomas De la Beche, the eminent nineteenth century geologist, founder and first Director of the British Geological Survey, the Museum of Practical Geology, the Royal School of Mines and the Mining Record Office. Although his name is well-known to geologists, probably few realize that he belonged to an old Jamaican family.

Several of our younger members, of both sexes, have become so interested that they are considering entering universities

in Britain or America with a view to making geology their profession. A number of high school teachers are convinced that geology should be made a school subject, and are planning to bring the matter before the Ministry of Education. Press and radio give good publicity to our activities, and I think it can be claimed that the Jamaica Group of the Geologists' Association is playing a worthy part in keeping geology in the public eye.

MYSTERY: How Can GeoTimes Run? or The Case of the Missing Yellow Envelope

In the center of all 18,700 February copies of GEOTIMES was a bright yellow envelope.

Finders were asked to send it to AGI with an appropriate and much-needed cash enclosure.

To date only 485 have been received. Help us by sending in your contribution to GEOTIMES—TODAY.



MANPOWER in a column -

By HOWARD A. MEYERHOFF
Scientific Manpower Commission

In several recent letters and telephone calls we have been asked what the Scientific Manpower Commission is and does. This is our answer.

The Commission is a private corporation, founded in 1953 to deal with general problems affecting scientific manpower, as official representatives of the American Association for the Advancement of Science, American Astronomical Society, American Chemical Society, American Geological Institute, American Institute of Biological Sciences, American Institute of Physics, American Psychological Association, Federation of American Societies for Experimental Biology, Policy Committee for Mathematics, and Policy Committee for Scientific Agricultural Societies. Each group nominates two members to serve on the Commission for terms of three years, and for the American Geological Institute John C. Frye, State Geologist of Illinois, and Howard A. Meyerhoff, Executive Director of the Commission, are currently serving. Officers for 1957 are John S. Nicholas, of Yale University, President; B. R. Stanerson, of the American Chemical Society, Vice President; and Glen Finch, of the National Research Council, Secretary-Treasurer. The Commission's offices are at 1507 M Street, N.W., Washington 5.

Since the line of demarcation between science and engineering is somewhat blurred, there is complete cooperation between SMC and the Engineering Manpower Commission of Engineers Joint Council. Activities fall into the three broad categories of recruitment, training, and utilization of scientific and engineering personnel. In the conviction that the teacher is the best recruiting agent, the Commission endeavors to place good guidance material in his hands. Recognizing that training begins in the elementary and secondary schools, the Commission has devised, aided, and abetted programs to place more well-trained teachers in our schools. It monitors the utilization of young scientists in the armed forces. It is concerned with the supply of and demand for scientists in industry, education, and government; and, when necessary, it has undertaken its own surveys to determine the facts. It is commonly consulted on



OIL IN UGANDA, Harris, Pallister & Brown, 33 pps., maps, well logs, Memoir IX, Geological Survey of Uganda, Entebbe, Uganda, Shs. 12/50.

A summary of petroleum exploration history and available data. Points up some possibilities. Contains bibliography of published and unpublished reports.

BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY, 1952 AND 1953, U. S. Geological Survey Bulletin 1035, 714 pp., 1956. Supt. of Documents, Washington, D. C. \$2.00.

SCIENCE AND ECONOMIC DEVELOPMENT: NEW PATTERNS OF LIVING, by Richard L. Meier, 266 pp., 1956, The Technology Press, MIT and John Wiley and Sons, Inc., 440 Fourth Ave., New York 16, N. Y. \$6.00.

This book probes the frontiers of human development based on an evaluation of our total current resources and the observed trends for future development. The extent of our non-renewable mineral and energy resources is considered to be a matter of price and energy. It is intimated that our mineral and fossil fuel reserves are generally on the downgrade. In appendix on problems of fundamental science and of applied research, no mention is made relating to these non-renewable resources. The book is interesting and provocative.

EXPLORATION FOR NUCLEAR RAW MATERIALS by Robert D. Nininger, 293 pp., D. Van Nostrand Co., Inc., Princeton, N. J. September 1956, \$7.50.

The International Conference on the Peaceful Uses of Atomic Energy yielded 125 papers which ranged across the entire

matters of policy by agencies in the Executive Branch of the Federal government, its testimony has been presented to Congressional committees in the Senate and in the House of Representatives, and its advice has been sought in the preparation of Congressional documents dealing with scientific and engineering manpower. The EMC-SMC Newsletter, which reaches nearly 12,000 readers monthly, is widely quoted in the press, in speeches, and in official documents.

In short, if it has to do with scientific manpower, like Kilroy, we were there.

fields of geology and exploration of uranium and thorium. Some deal with the broad aspects and some with specific details: to appreciate and coordinate this mass of information requires a respectable command of the literature. Niningger has abstracted the most significant contributions from almost all the Geneva papers on uranium and thorium, and arranged them in a logical progression. In condensing the papers neither fundamentals nor interpretations have been sacrificed. Appended are lists of Geneva Conference papers on geology and prospecting, and indices to subjects and authors.

ATOMIC ENERGY, by A. Radcliffe & E. C. Roberson, 142 pp., 1956. *The Philosophical Library, Inc.*, 15 East 40th St., New York 16, N. Y. \$4.75

A handy little book, first published in Britain, which discusses the concepts of the atom and the military and peacetime applications of the energy of the atom. A layman will read it with interest and the non-nuclear scientist will find it clarifies various ideas.

THE FUTURE OF ARID LANDS, edited by Gilbert F. White, pp. 453, 1956, Publ. No. 43, Amer. Assoc. Adv. of Science, 1515 Massachusetts Ave., N.W., Washington 5, D. C., \$6.75.

This volume brings together a wide range of papers presented in May 1955 when scientists of many disciplines from 17 nations gathered in New Mexico for the International Arid Lands meetings. The challenge to and role of science in addressing the fundamental problems in the reclamation and utilization is dominant throughout the papers presented.

GLOSSARY OF PEDOLOGIC (SOILS) AND LANDFORM TERMINOLOGY FOR SOILS ENGINEERS, by the Highway Research Board, 32 pp., 1957 NAS-NRC Publication 481, available from National Academy of Sciences, 2101 Constitution Ave., N.W., Washington 25, D. C., \$0.80.

The glossary, prepared by the Committee on Surveying, Mapping, and Classification of Soils, should be helpful to geologists, particularly those who are interested in engineering geology. The use of certain terms by the soil scientists is somewhat divergent from the usual geologic usage.

COAL RESOURCES OF THE UPPER PART OF THE ALLEGHANY FORMATION IN OHIO, by Russell A. Brant, 68 pp., 1956 R. I. 29, Ohio Geological Survey, Orton Hall, Columbus 10, Ohio, \$0.50.

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By W. M. Ewing, Columbia University; F. Press, California Institute of Technology; and W. S. Jardetzky, Columbia University. McGraw-Hill Series in the Geological Sciences. 375 pages, \$10.00.

A vitally important new work in geophysical prospecting, seismology, acoustical problems, and oceanography. It fully covers the experimental and theoretical aspects of the subject, spanning world literature to give new investigators the first review of the field.

GEOLOGY: Principles and Processes

By William H. Emmons; George A. Thiel, University of Minnesota; Clinton R. Stauffer, California Institute of Technology; and Ira S. Allison, Oregon State College. Fourth Edition. 642 pages, \$6.50.

Analyzes simply and logically the place of the earth in the universe, its materials, the processes which shape its external features, its movements and their results, and its mineral resources. Greatly improved and fully modernized, it is more richly illustrated than ever. As in previous editions, the book surveys broadly the general field of physical geology.

PRINCIPLES OF ENGINEERING GEOLOGY AND GEOTECHNICS

Geology, Soil and Rock Mechanics, and
Other Earth Sciences in Civil Engineering

By D. P. Krynnine, Berkeley, Calif.; and W. R. Judd, Denver, Colorado. 736 pages, \$10.00.

A text to teach engineers about geology and educate geologists in those phases of civil engineering applicable to their work. There is an unusual blending of geological information with engineering, with such topics as: principles of modern design and construction of dams, bridges and tunnels; soil mechanics; and integration of rock mechanics and geology.

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LETTERS

DEAR EDITOR:

In the recent Report of the Advisory Committee on Minerals Research to the N.S.F., the Geologists' Subcommittee submitted a most detailed and inclusive list of topics for research. To the non-specialist this list is more diffuse, therefore less appealing, than the central suggestion of the geochemists for a study of the fluids in rocks. Perhaps this diversity is inherent in geology, and what the Subcommittee had in mind was more and better field work all around, utilizing modern quantitative techniques.

There is one way in which a National Foundation could revitalize research in economic geology, and we might call it the "Fund for the Academic Drillhole." How many of us know deposits where a genetic theory could be adequately tested by data from a drillhole in some critical location, a day's work with a Traxcavator, the re-opening of a blocked adit, or the pumping-out of a pit?

Company geologists have neither time nor temerity for such ventures, and in most research grants such expenses are out of the question. The U.S.B.M. (quite rightly) drills for ore, not for isotopes of albitization.

Before authorizing assistance of the type suggested, the Foundation would naturally want to be assured that all possible surface data had been gathered and studied by the grantee, and that sufficiently important conclusions of a fundamental nature were indicated.

Your comments are invited.

DR. GRABENHORST

NSF REGISTER PROJECT

This is a very good Questionnaire (National Earth Science Register of Scientific and Technical Personnel). For the large amount of data included, it is one of the easiest I have ever seen to fill out. Congratulations.

ED GODDARD
Univ. of Michigan

EDITOR: We are pleased to have this word from a busy man. Average completion time is 20 minutes. Have you returned your Q?

DEAR EDITOR:

May I take this opportunity to express my sincere appreciation for the highly informative articles, columns, and features in GeoTimes. The excellent quality of the publication's contents has provided a thought-provoking means of keeping up to date with many aspects of the Earth Sciences that one in Geophysics normally misses.

Best wishes to the GeoTimes staff in 1957, and continued success in helping to keep Earth Scientists well-informed.

Sincerely,

CARL R. WENZ, JR.
Geophysicist



ROCK CHIPS

by SANDSTONE SAM

A baby geology student writes, "One of the most famous early paleontologists was H. M. S. Challenger."

• • •

A coed in geology, when queried on how to measure the height of a cliff with an aneroid barometer, scratched her pretty little head, then piped up with this answer. "I would tie the barometer to a rope, lower it to the bottom of the cliff, then measure the rope."—Hmmm, it's probably more accurate, at that.

• • •

Don't start vast projects with half-vast ideas.

• • •

Any data, no matter how scanty, is probably a better basis for decision than a pure guess.

Wythe A. Broadbrush
General Geologist.

• • •

A famous and prolific literary geologist of not too many years gone by was likened by a contemporary to an earth worm. The earth worm is a simple creature—all goes in one end and . . .

NEW Ideas Products Services

GEO-TIMES will welcome press releases and notices of new ideas, products and services from companies and individuals for possible use in this section.

PAULIN MANUAL. A new manual entitled, *Precision Altimeter Survey Procedures*, by Robert A. Hodgson is available for limited distribution by writing **EDUCATIONAL DIVISION, AMERICAN PAULIN SYSTEM, 1524 FLOWER ST., LOS ANGELES 15, CALIFORNIA.**

DINOSAUR FOOTPRINT. A green ceramic ash tray modeled as an accurate replica of a small Triassic dinosaur is available at a cost of \$1.75 from **ELIHU POTTERY, 566 GRAND AVE., ENGLEWOOD, N. J.**



RONKA GROUND EM UNIT is a new portable lightweight geophysical instrument which is particularly adapted to field surveys to locate and delineate sulphide bodies. The unit utilizes two horizontal electromagnetic loops, is powered by flashlight batteries, which may be operated by a two-man party. Developed by Vaino Ronka, a Finnish engineer. Further information may be obtained by writing **DEPT. GT, HUNTING ASSOCIATES, LTD., 1450 O'CONNER DRIVE, TORONTO, CANADA.**

SOIL TESTING MANUAL dealing with the unconfined compression testing of cohesive soils, describes apparatus, test procedures, interpretations, use of test results. Limited distribution of this first of a series of soil test manuals is being made by **SOILTEST INC., 4711 W. NORTH AVE., CHICAGO 39, ILLINOIS.**

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VACANCIES

ALLEGHENY COLLEGE, Meadville, Pennsylvania. Instructor or Assistant Professor of Geology to teach petrology, geomorphology or other courses to undergraduate majors and some geology in general education, beginning September. Master's degree essential, prefer doctorate in progress or completed. Apply to W. H. Parsons, Dept. of Geology.

VASSAR COLLEGE, Poughkeepsie, N. Y. Needed for Sept., 1957, a man or woman with A.M. or better, specializing in mineralogy and petrology. Write Dept. of Geology.

RESEARCH COUNCIL OF ALBERTA requires a geophysicist (or physicist) and 4 geologists for groundwater studies (B.A., B.Sc.). Initial salary \$4,400.00-\$5,000.00 per annum. Council also requires a sedimentationist or stratigrapher (M.Sc. or Ph.D.) to do research on the Alberta Tar Sands and a geologist (Ph.D.) to join Council's petroleum geochemistry section. The salaries for these two positions are dependent upon experience but in the scale \$6,000.00-\$7,000.00 per annum. Transcripts of academic records, names of 3 referees, record of experience and a recent photograph should be sent to: The Secretary, Research Council of Alberta, 87th Avenue & 114th Street, EDMONTON, Alberta, Canada.

SAINT LOUIS UNIVERSITY, St. Louis, Missouri. Engineering or Economic Geologist. September 1957. Salary depending on qualifications. Apply: Director, Department of Geology and Geological Engineering.

HAMILTON COLLEGE, Hamilton, Ontario. A staff-position will be available commencing July or September 1957 for a Curator of Geology. Applicant should have Ph.D. or equivalent with specialized training in paleontology. Duties include classification and organization of university collection of fossils, rocks and minerals, with an additional light teaching load and responsibility to carry out research work. The appointment will probably be initially at the rank of Lecturer or Assistant Professor but will depend on qualifications. Enquiries to the Chairman; Dept. of Geology.

SOUTHEAST MISSOURI STATE COLLEGE, Cape Girardeau, Missouri. Geology teacher for expanding program; Ph.D. or M.S. State training, experience and availability. Retired teachers invited to inquire.

BOX 78. Two vacancies for ASSISTANT PROFESSOR, salary \$5400 for 9 months. Ph.D. essential. One as paleontologist, the other as geologist with general background in structural and field studies.

MISSOURI SCHOOL OF MINES, Rolla, Missouri. STRUCTURAL GEOLOGIST to teach one semester course at junior level and one or more courses at graduate level, and to teach courses to be selected from fields of map interpretation, petrology, or mineralogy. Assistant or Associate Professorship. Salary \$5000 to \$6000 for 9 months service. GRADUATE ASSISTANTSHIP permitting candidate for advanced degree to take ½ normal load. Require 12 hours teaching per week. \$1400 for 9 months of service.

WEST VIRGINIA UNIVERSITY, Morgantown, West Virginia. Geologist, preferably with engineering background, to conduct statewide survey of road-building aggregates. Experience in reconnaissance, petrography, mapping, aggregate testing methods essential. Familiarity with aerial photo recon helpful. Association with University or State possible after completion of two and one half year survey. Salary dependent on ability and qualifications. Apply: Director, Highway Aggregates Research Project, Engineering Experiment Station, W. Va. Univ., Morgantown, W. Va.

VERMONT GEOLOGICAL SURVEY, Burlington. Need for geologists experienced in handling exploratory equipment. Three to four month summer mapping projects beginning June, 1957. Write: State Geologist.

LAMAR STATE COLLEGE, Beaumont, Texas. Teaching position. Minimum background—Master's degree. Salary range \$4,400-\$6,000 for 9 months. Apply: Head, Dept. of Geology.

POSITIONS WANTED

BOX 242. GEOLOGIST, 35, B.S., married, 5 years' major oil company experience in northern New Mexico and West Texas, including administrative, seismic and some surface work. Desires to relocate. Excellent references.

BOX 263. Paleontologist-stratigrapher, invertebrate and micropaleontology. 42, married, Ph.D., 16 years' experience teaching, research, and with U. S. Government. Field experience throughout North America and western Europe. Over 40 publications. Phi Beta Kappa; Fellow, G.S.A.; A.A.P.G.; S.E.P.M.; G.S. London; G.S. France, etc. Desires teaching position in University with graduate program, or research with State Survey.

BOX 266. Geologist, 29, A.B. plus 1 year post grad. Chemistry minor. Experience in Cartography, Geophysics and Electrochemical engineering. At present head high school science department. Desires permanent position with industrial or oil company. Available in June.

BOX 270. Paleontologist, Ph.D., 30, 4 years industrial experience, 2 years teaching experience at state university. Specialties geochemistry and paleoecology. Desires teaching position starting June or September, 1957.

BOX 278. Geologist, married, age 66; M.S., 30 years experience as Head of Department and teacher in the same college. Desire appointment on a temporary basis. Location anywhere. Prepared to teach physical geology, mineralogy, optical mineralogy, petrography of igneous, metamorphic and sedimentary rocks, and economic geology. Field experience in engineering geology in heavy construction and mining. Salary open. Retiring Aug. 1957; available after that date. Member of GSA; AAPG; SEPM.

BOX 279. EXPLORATION AND ADMINISTRATIVE GEOLOGIST, 30, A.B., A.M. in Geology, married, 5 years experience in valuation and development of minerals and petroleum properties. Numerous contacts in western mining circles. Familiar with organizational, financial and corporate problems common to the minerals industry. Excellent references. Available immediately. Will relocate.

BOX 282. Geomorphologist and Pleistocene geologist, with background in paleontology, structure, and field methods. 5 years experience in field work and teaching. Wants teaching position beginning September. Holds 3 degrees and currently finishing Ph.D. at leading university. Excellent references.

BOX 283. Economic Geologist, 33, M.S., Ph.D., wishes to associate with domestic or international consultant, investment or exploration group or represent N. American mineral interests in Europe. 6 years of domestic and foreign exploration and evaluation work in metallic and non-metallic prospects. Working knowledge of French, Spanish, German, Dutch, Swedish. Aerial photo interpretation.

BOX 284. Available September 1, 1957. One complete and established department of geology and geophysics consisting of seven professors with Ph.D. degrees and six with M.S. degrees. Present positions have become untenable due to excessive teaching loads, lack of equipment, and poor salaries. Have hammers and coffee pots, will travel.

BOX 285. Mining Exploration Geologist, 33, married, BA Geology. 3 years field mapping and exploration in Western States in copper, iron, tungsten, chromite, uranium, and non-metals. Some geophysics, including gravimeter and magnetometer. Desires to relocate preferably in Colorado.

BOX 286. Geologist, 32, B.S., married, 3 years major uranium company, experience in field geological work, drilling supervision, and evaluation of mining properties in Utah, Arizona, Colorado and Mexico. Speak Spanish fluently. Desires to relocate.

BOX 287. Geomorphologist and Stratigrapher, B.S., M.S., 27, one year's experience with major oil company, desire association with State survey or research branch interested in Paleozoic of Rocky Mts. or teaching position in college with Ph.D. program, publication privileges wanted.

BOX 288. GEOLOGIST-PILOT, B.S. Geology, commercial license and multi-engine rating, also instrument rating soon. 26, married, some Spanish. Wants to do exploration geology and/or flying. Will work anywhere.

BOX 289. GEOLOGIST, 31, 6 yrs. varied experience in mine evaluation, detailed and reconnaissance mapping, drill supervision; including 2 yrs. in Africa. Working knowledge Portuguese and Spanish. Seeks foreign position, available on 30 days notice.

BOX 290. GEOLOGIST, M.S., 31, married, 5 yrs. experience, desires position with progressive organization. Field work in clastic and carbonate sediments, metamorphics, and metavolcanics. Extensive geochemical prospecting experience, mine and prospect examination and evaluations, underground experience, geophysical prospecting experience and training. Available May. Complete resume sent promptly.

BOX 291. GEOLOGIST, Ph.D., 43, married. Desires teaching position. Four years teaching experience and ten years experience with the U. S. Geological Survey. Background is principally in mineralogy, petrology, economic geology and regional geology.

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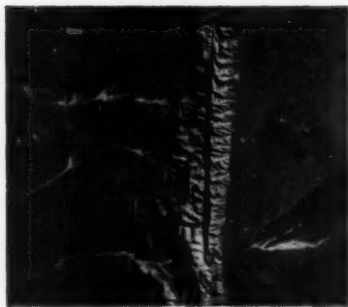
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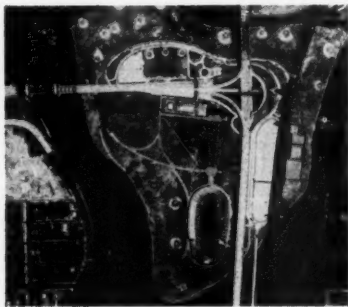
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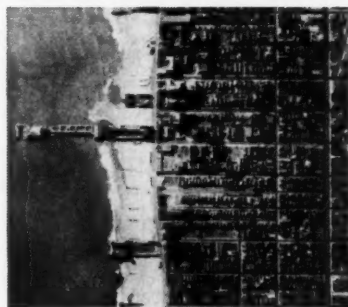
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